

CLAIMS

What is claimed is:

1. An apparatus for providing a gas from a gas supply to at least two different zones in a process chamber, comprising:
 - 5 a flow divider for providing a fluid connection to the gas supply, wherein the flow divider splits gas flow from the gas supply into a plurality of legs;
 - a master leg in fluid connection with the flow divider, wherein the master leg comprises a master fixed orifice; and
 - 10 a first slave leg in fluid connection with the flow divider and in parallel with the master leg, wherein the first slave leg comprises:
 - a first slave leg valve; and
 - a first slave leg fixed orifice.
 - 15 2. The apparatus, as recited in claim 1, further comprising:
 - a second slave leg in fluid connection with the flow divider and in parallel with the master leg and the first slave leg, wherein the second slave leg comprises:
 - a second slave leg valve; and
 - 20 a second slave leg fixed orifice.
 3. The apparatus, as recited in claim 2, further comprising:
 - a third slave leg in fluid connection with the flow divider and in

parallel with the master leg, the first slave leg, and the second slave leg,
wherein the third slave leg comprises:

a third slave leg valve; and

a third slave leg fixed orifice.

5

4. The apparatus, as recited in claim 3, further comprising:

a fourth slave leg in fluid connection with the flow divider and in
parallel with the master leg, the first slave leg, the second slave leg, and the
third slave leg, wherein the fourth slave leg comprises:

10 a fourth slave leg valve; and

a fourth slave leg fixed orifice; and

a fifth slave leg in fluid connection with the flow divider and in
parallel with the master leg, the first slave leg, the second slave leg, the
third slave leg, and the fourth slave leg, wherein the fifth slave leg

15 comprises:

a fifth slave leg valve; and

a fifth slave leg fixed orifice.

20 5. The apparatus, as recited in claim 4, further comprising a tuning
gas system in fluid connection with at least one of the master leg, first
slave leg, second slave leg, third slave leg, fourth slave leg, and fifth slave
leg.

6. The apparatus, as recited in claim 5, wherein the tuning gas system

comprises:

at least one tuning gas source; and

at least one mass flow controller.

5 7. The apparatus, as recited in claim 6, wherein the tuning gas system
is in fluid connection with the master leg down stream from the master
fixed orifice.

10 8. The apparatus, as recited in claim 7, further comprising a zone
selection device connected to the master leg down stream from the master
fixed orifice.

9. The apparatus, as recited in claim 8, wherein the first, second, third,
fourth, and fifth leg fixed orifices are flat plate fixed orifices.

15

10. The apparatus, as recited in claim 4, wherein the first, second, third,
fourth, and fifth leg fixed orifices are flat plate fixed orifices.

20 11. The apparatus, as recited in claim 10, further comprising a zone
selection device connected to the master leg down stream from the master
fixed orifice.

12. The apparatus, as recited in claim 3, wherein the first, second, and
third leg fixed orifices are flat plate fixed orifices.

13. The apparatus, as recited in claim 12, further comprising a zone selection device connected to the master leg down stream from the master fixed orifice.

5

14. The apparatus, as recited in claim 3, further comprising a zone selection device connected to the master leg down stream from the master fixed orifice.

10 15. The apparatus, as recited in claim 1, wherein the master fixed orifice and the first leg fixed orifices are flat plate fixed orifices.

15 16. The apparatus, as recited in claim 15, further comprising a zone selection device connected to the master leg down stream from the master fixed orifice.

17. A semiconductor chip formed using the apparatus, as recited in claim 1.

20 18. An apparatus for providing a gas from a gas supply to at least two different zones in a process chamber, comprising:

a flow divider for providing a fluid connection to the gas supply, wherein the flow divider splits gas flow from the gas supply into a plurality of legs;

25 a master leg in fluid connection with the flow divider, wherein the

master leg comprises a master flat plate fixed orifice;

a first slave leg in fluid connection with the flow divider and in parallel with the master leg, wherein the first slave leg comprises:

a first slave leg valve; and

5 a first slave leg flat plate fixed orifice;

a second slave leg in fluid connection with the flow divider and in parallel with the master leg and the first slave leg, wherein the second slave leg comprises:

a second slave leg valve; and

10 a second slave leg flat plate fixed orifice;

a third slave leg in fluid connection with the flow divider and in parallel with the master leg, the first slave leg, and the second slave leg, wherein the third slave leg comprises:

a third slave leg valve; and

15 a third slave leg flat plate fixed orifice;

a tuning gas system in fluid connection with at least one of the master leg, first slave leg, second slave leg, and third slave leg, wherein the tuning gas system comprises:

at least one tuning gas source; and

20 at least one mass flow controller; and

a zone selection device connected to the master leg down stream from the master fixed orifice.